



CTC Laboratories, Inc.



2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

Certificate #4340.01

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TEST REPORT

Report No. : CTC20230976E10

Applicant : Lumi United Technology Co., Ltd

Address..... : Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Manufacturer..... : Lumi United Technology Co., Ltd

Address..... : Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Product Name : Temperature and Humidity Sensor T1

Trade Mark : Aqara

Model/Type reference..... : WS-S01

Listed Model(s) : WSDCGQ12LM-G0, WSDCGQ12LM, TH-S02D

Standard : AS/NZS CISPR 32: 2015 + AMD 1: 2020

Date of receipt of test sample....: Apr. 20, 2023

Date of testing.....: Apr. 21, 2023 ~ Apr. 28, 2023

Date of issue.....: May. 05, 2023

Result.....: PASS

Compiled by:

(Printed name+signature) Terry Su

Supervised by:

(Printed name+signature) Eric Zhang

Approved by:

(Printed name+signature) Totti Zhao

Testing Laboratory Name : CTC Laboratories, Inc.

Address..... : 2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[AS/NZS CISPR 32: 2015 + AMD 1: 2020](#) – Electromagnetic compatibility of multimedia equipment - Emission requirements

1.2. Report version

Revised No.	Date of issue	Description
01	May. 05, 2023	Original



1.3. Test Description

Emission			
Test Item	Standard requirement (AS/NZS CISPR 32)	Result	Test Engineer
Radiated Emission	A.2	Pass	Ice Lu
Conducted Emission(AC Mains)	A.3	N/A	N/A
Conducted Emission(Signal Mains)	A.3	N/A	N/A

Note: "N/A" is no application

The measurement uncertainty is not included in the test result.



1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC)Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 " Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test	Measurement Frequency Range	U (dB)	Note
Conducted Emission	9kHz ~ 30MHz	3.08	Main Power Port
Conducted Emission	150kHz ~ 30MHz	4.26	Telecommunication
Radiated Emission	30MHz ~ 1000MHz	4.51	3m chamber 2
Radiated Emission	30MHz ~ 1000MHz	4.5	3m chamber 3
Radiated Emission	1GHz ~ 6GHz	5.7	3m chamber 3

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Lative Humidity	55 %
Air Pressure	102kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Lumi United Technology Co., Ltd
Address:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Manufacturer:	Lumi United Technology Co., Ltd
Address:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

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2.2. General Description of EUT

Product Name:	Temperature and Humidity Sensor T1
Trade Mark:	Aqara
Model/Type reference:	WS-S01
Listed Model(s):	WSDCGQ12LM-G0, WSDCGQ12LM, TH-S02D
Model Difference:	All these models are identical in the same PCB, layout and electrical circuit, only named differently for marketing purpose.
Power supply:	3Vdc from button battery
Hardware version:	V1.0.1
Software version:	V1.0.1
Zigbee	
Modulation:	O-QPSK
Operation frequency:	2405MHz ~ 2480MHz



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2.3. Accessory Equipment Information

Equipment Information			
Name	Model	S/N	Manufacturer
Aqara Hub	ZHWG17LM	/	Aqara
Mobile phone	P20 Pro	/	HUAWEI
Router	E8820 V3	---	ZTE

Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/



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2.4. Description of Test Modes

Test mode	Normal Working + Zigbee
1	■

Note:

- is operation mode.

Test item	Test mode
Radiated Emission	T1
Conducted Emission(AC Mains)	N/A
Conducted Emission(Signal Mains)	N/A



2.5. Measurement Instruments List

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101112	Dec. 16, 2023
2	LISN	R&S	ENV216	101113	Dec. 16, 2023
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 16, 2023
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 16, 2023
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 16, 2023
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Radiated Emission (3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 07, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-648	Dec. 07, 2024
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024
5	Pre-Amplifier	SONOMA	310	186194	Dec. 16, 2023
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 16, 2023
7	Test Receiver	R&S	ESCI7	100967	Dec. 16, 2023
8	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024
9	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Radiated Emission (3m chamber 3)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	01026	Dec. 18, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 01, 2024
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 16, 2023
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 16, 2023
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 16, 2023
6	3m chamber 3	YIHENG	EE106	/	Sep. 09, 2023
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Note: The Cal. Interval was one year.

3. EMC EMISSION TEST

3.1. Radiated Emission

LIMIT

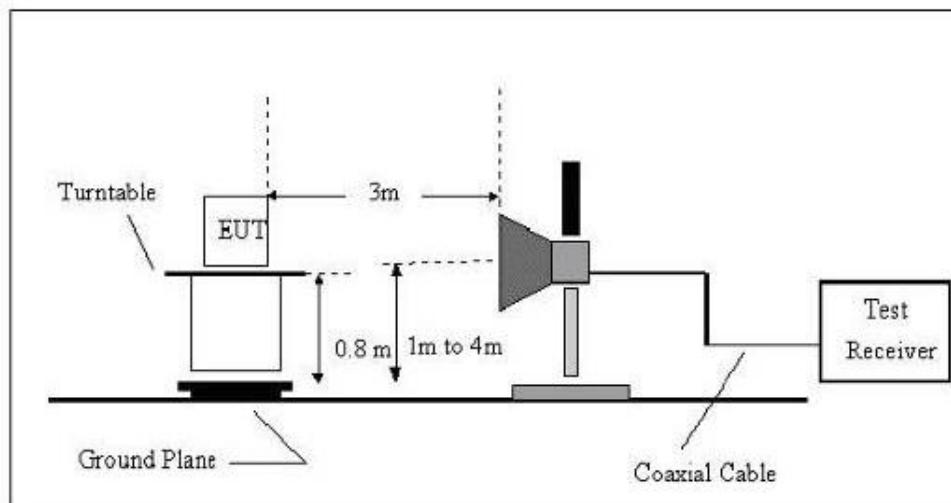
Please refer to CISPR 32 Table A.4 & A.5

Frequency range (MHz)	Quasi-peak limits dB μ V/m@3m	Quasi-peak limits dB μ V/m@10m
30~230	40	30
230~1000	47	37

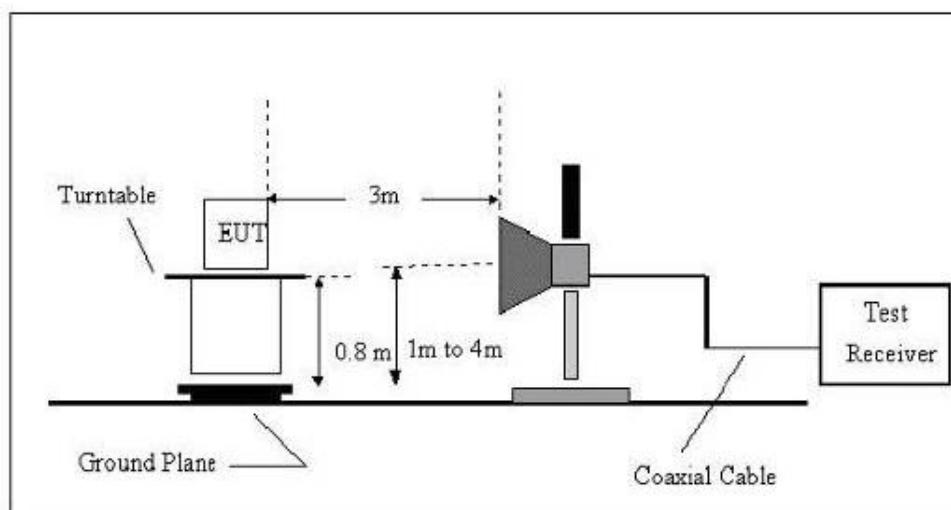
Frequency range (GHz)	Average limits dB μ V/m@3m	Peak limits dB μ V/m@3m
1 ~ 3	50	70
3 ~ 6	54	74

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up Frequency below 1 GHz



(B) Radiated Emission Test Set-Up Frequency above 1GHz



TEST PROCEDURE

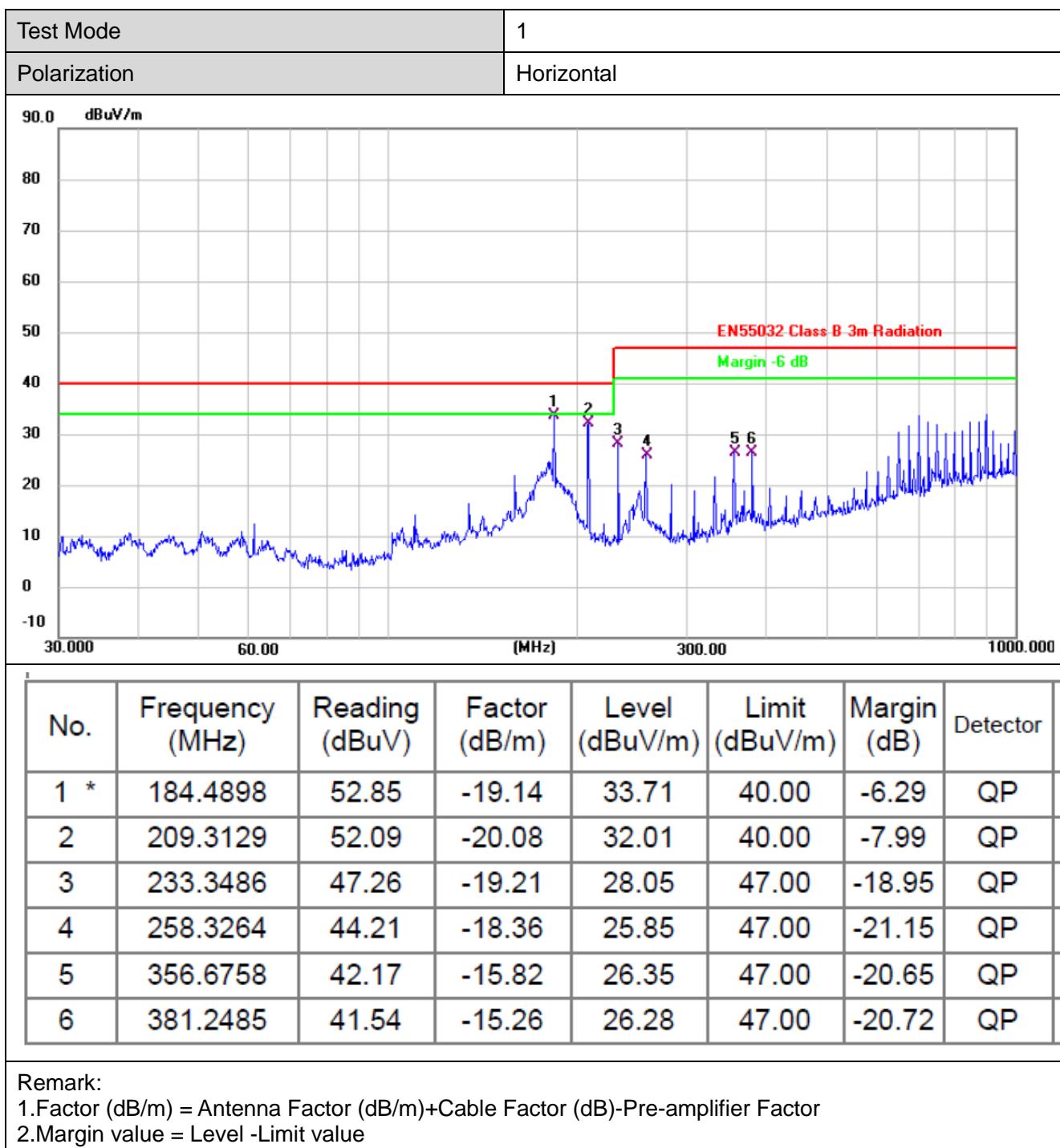
Please refer to CISPR 55032 Clause 6.3 for the measurement methods

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

(1) 30MHz-1000MHz



Test Mode	1																																																								
Polarization	Vertical																																																								
<table border="1"> <thead> <tr> <th>No.</th><th>Frequency (MHz)</th><th>Reading (dBuV)</th><th>Factor (dB/m)</th><th>Level (dBuV/m)</th><th>Limit (dBuV/m)</th><th>Margin (dB)</th><th>Detector</th></tr> </thead> <tbody> <tr> <td>1</td><td>36.7662</td><td>43.32</td><td>-17.81</td><td>25.51</td><td>40.00</td><td>-14.49</td><td>QP</td></tr> <tr> <td>2</td><td>110.5687</td><td>47.89</td><td>-20.10</td><td>27.79</td><td>40.00</td><td>-12.21</td><td>QP</td></tr> <tr> <td>3 *</td><td>184.4898</td><td>54.79</td><td>-19.14</td><td>35.65</td><td>40.00</td><td>-4.35</td><td>QP</td></tr> <tr> <td>4</td><td>209.3129</td><td>49.88</td><td>-20.08</td><td>29.80</td><td>40.00</td><td>-10.20</td><td>QP</td></tr> <tr> <td>5</td><td>233.3487</td><td>43.94</td><td>-19.21</td><td>24.73</td><td>47.00</td><td>-22.27</td><td>QP</td></tr> <tr> <td>6</td><td>504.7062</td><td>38.49</td><td>-12.55</td><td>25.94</td><td>47.00</td><td>-21.06</td><td>QP</td></tr> </tbody> </table>		No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	1	36.7662	43.32	-17.81	25.51	40.00	-14.49	QP	2	110.5687	47.89	-20.10	27.79	40.00	-12.21	QP	3 *	184.4898	54.79	-19.14	35.65	40.00	-4.35	QP	4	209.3129	49.88	-20.08	29.80	40.00	-10.20	QP	5	233.3487	43.94	-19.21	24.73	47.00	-22.27	QP	6	504.7062	38.49	-12.55	25.94	47.00	-21.06	QP
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector																																																		
1	36.7662	43.32	-17.81	25.51	40.00	-14.49	QP																																																		
2	110.5687	47.89	-20.10	27.79	40.00	-12.21	QP																																																		
3 *	184.4898	54.79	-19.14	35.65	40.00	-4.35	QP																																																		
4	209.3129	49.88	-20.08	29.80	40.00	-10.20	QP																																																		
5	233.3487	43.94	-19.21	24.73	47.00	-22.27	QP																																																		
6	504.7062	38.49	-12.55	25.94	47.00	-21.06	QP																																																		
<p>Remark:</p> <p>1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor</p> <p>2. Margin value = Level -Limit value</p>																																																									

(2) Above 1000MHz

Test Mode	1													
Polarization	Horizontal													
90.0 dBuV/m														
EN 55032 Class B 3M Above-1G Peak														
EN 55032 Class B 3M Above-1G AVG														
1	1613.490	51.86	-11.36	40.50	74.00	-33.50	peak							
2	1613.490	40.90	-11.36	29.54	54.00	-24.46	AVG							
3	2022.150	52.44	-9.30	43.14	74.00	-30.86	peak							
4	2022.150	39.84	-9.30	30.54	54.00	-23.46	AVG							
5	3973.530	47.34	-4.51	42.83	74.00	-31.17	peak							
6 *	3973.530	36.05	-4.51	31.54	54.00	-22.46	AVG							
Remark:														
1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor														
2. Margin value = Level -Limit value														



Test Mode	1													
Polarization	Vertical													
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector							
1	1534.540	51.04	-11.49	39.55	74.00	-34.45	peak							
2	1534.540	43.03	-11.49	31.54	54.00	-22.46	Avg							
3	2561.707	48.89	-7.22	41.67	74.00	-32.33	peak							
4	2561.707	37.76	-7.22	30.54	54.00	-23.46	Avg							
5	3931.041	47.57	-4.71	42.86	74.00	-31.14	peak							
6 *	3931.041	37.25	-4.71	32.54	54.00	-21.46	Avg							
<p>Remark: 1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2. Margin value = Level -Limit value</p>														

3.2. Conducted Emission (AC Mains)

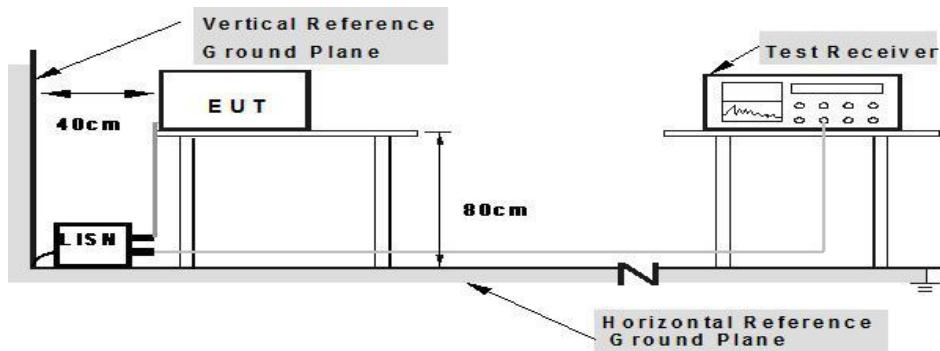
LIMIT

Please refer to AS/NZS CISPR 32: 2015 Clause A.3

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.
 NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

TEST CONFIGURATION



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMH) are 80 cm from EUT and at least 80 cm from other units and other metal planes

TEST PROCEDURE

Please refer to CENELEC EN 55032 Annex A3 Table A.8

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

3.3. Conducted Emission (Signal Mains)

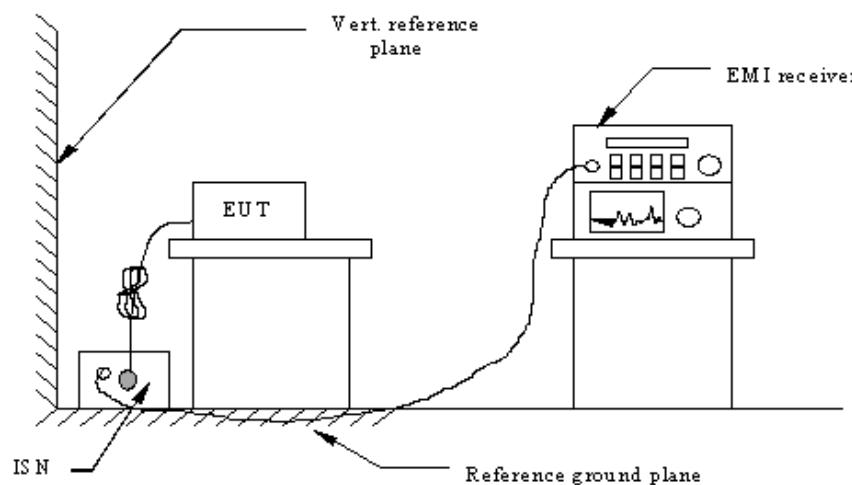
LIMIT

Please refer to AS/NZS CISPR 32: 2015 Clause A.11

Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 ~ 30	74	64	30	20

Note: if "150Ω to 50Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to CENELEC EN 55032 section C4

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

4. EUT TEST PHOTOS

Radiated Measurement (30MHz~1000MHz)

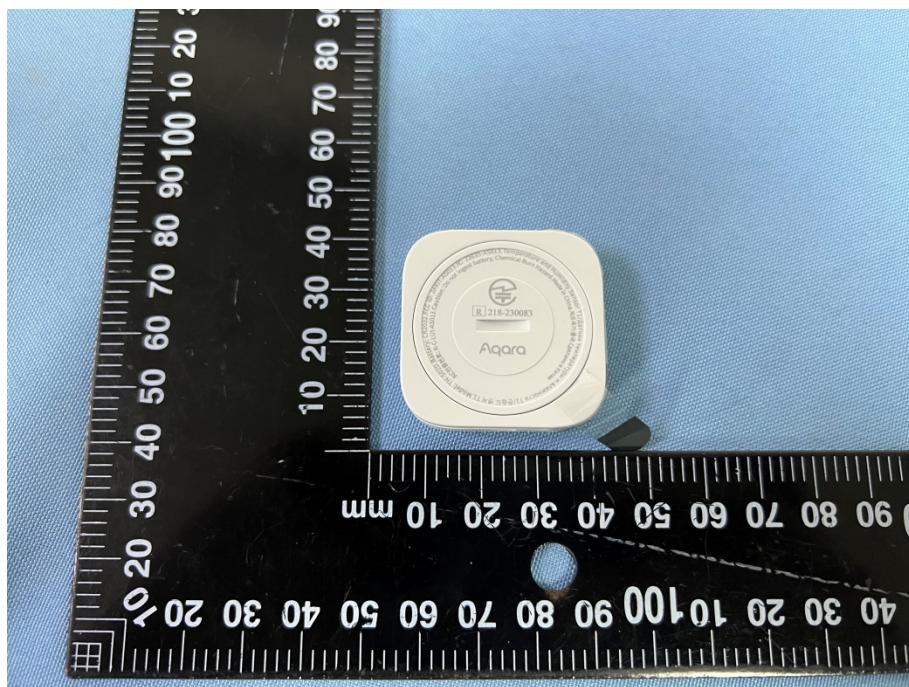
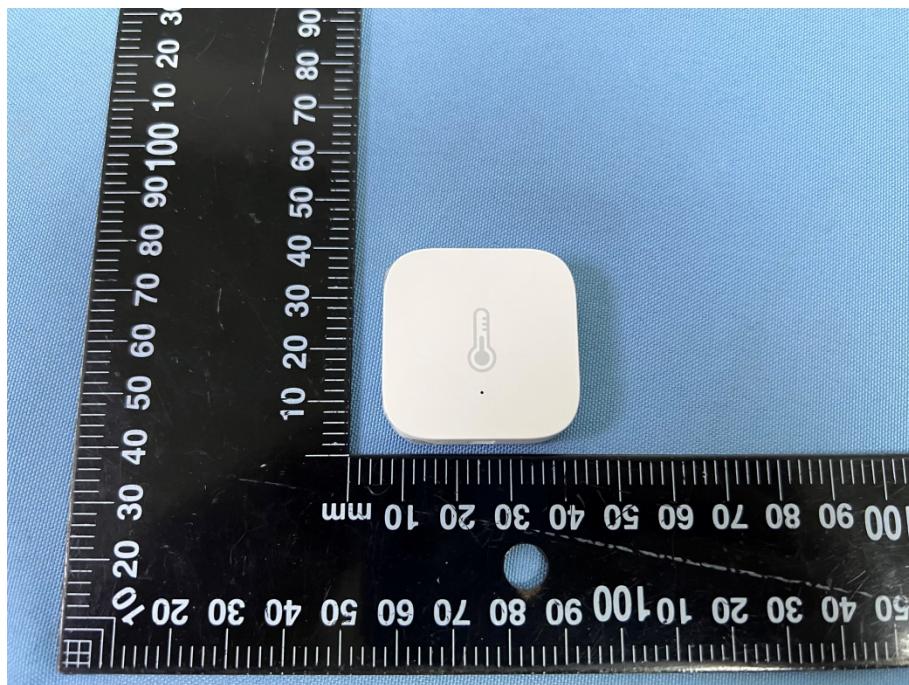


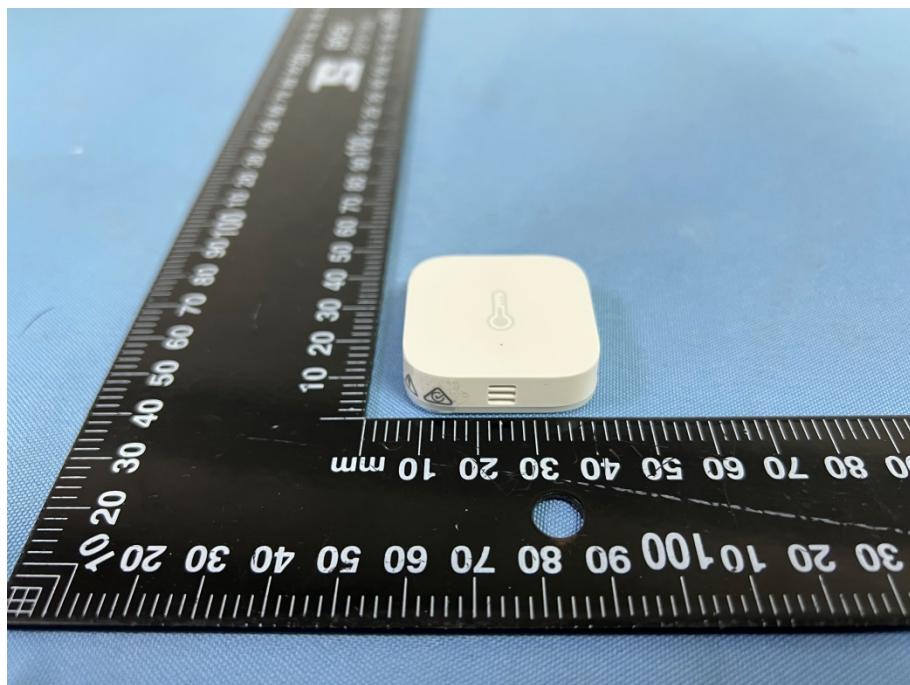
Radiated Measurement (1000~6000MHz)



5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

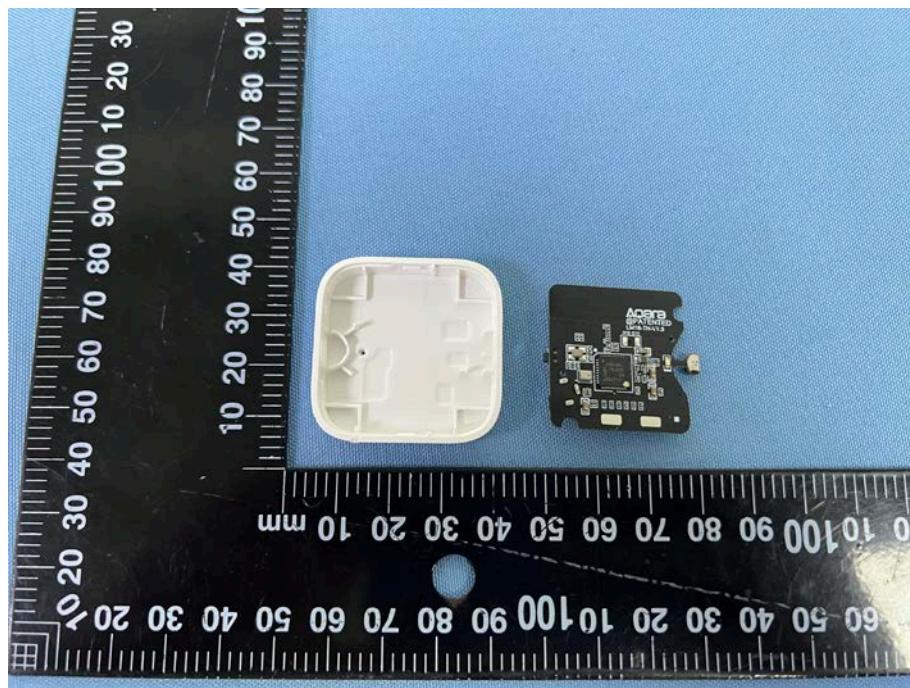
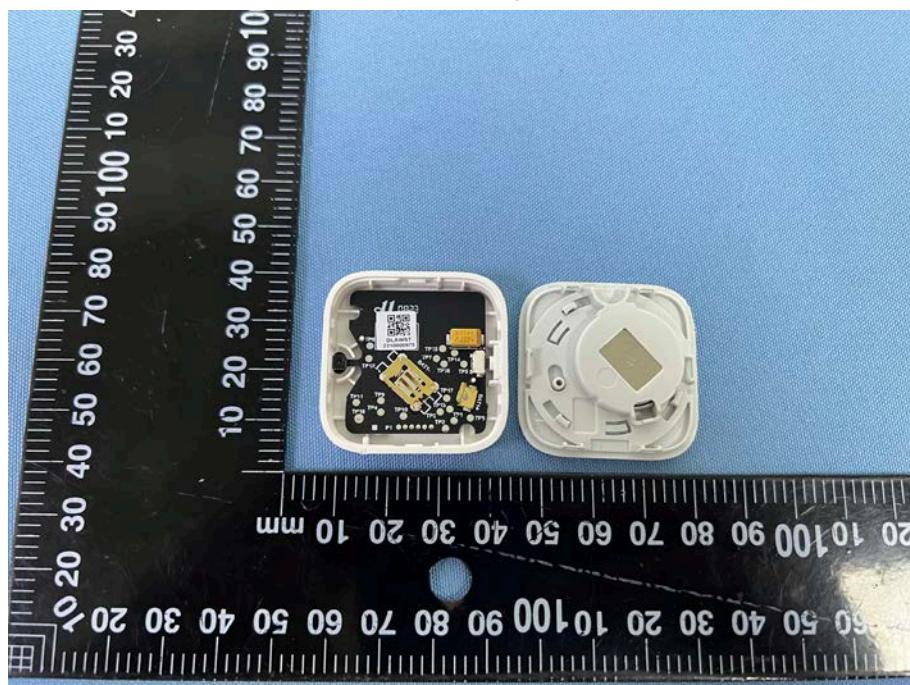
External Photographs

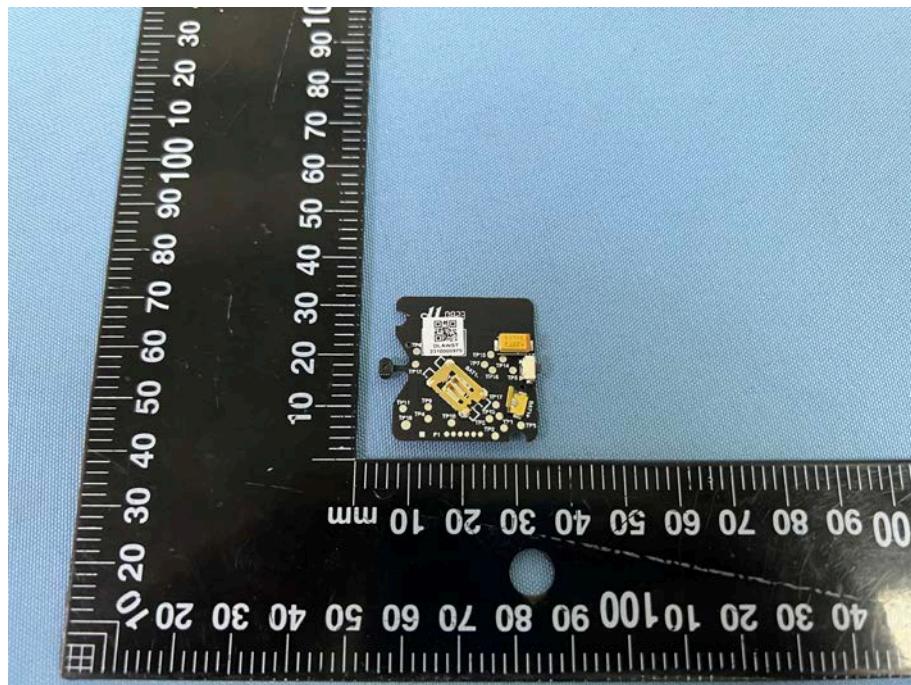
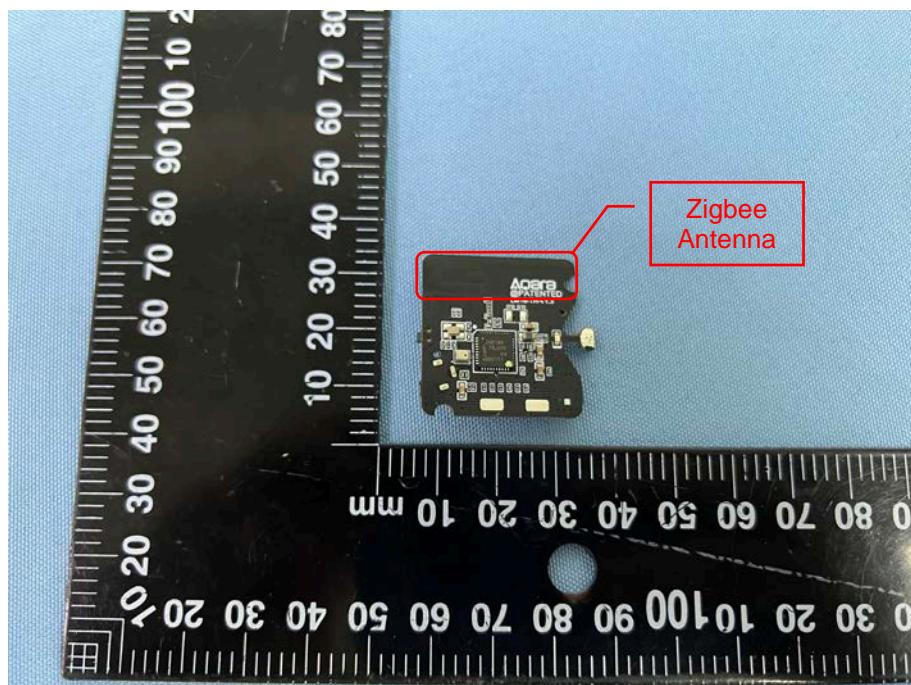






Internal photographs





*****THE END*****